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SPECTRUM ORBIT UTILIZATION PROGRAM DOCUMENTATION: SOUP5 VERSION 3.8 USER'S MANUAL - VOLUME II (APPENDICES A THROUGH G)

CR-174890

FINAL REPORT

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J. DAVIDSON, H. R. OTTEY, P. SAWITZ AND F. S. ZUSMAN

PREPARED UNDER CONTRACT No. NAS3-22885 FOR NASA Lewis Research Center

ORI Silver Spring, Maryland 20910

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10 June 1985

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ERROR CORRECTIVE CODES CHECKOUT CHANNEL CAPACITY

J. DAVIDSON, H. R. OTTEY, P. SAWITZ AND F. S. ZUSMAN

PREPARED UNDER CONTRACT No. NAS3-22885 FOR NASA LEWIS RESEARCH CENTER

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APPENDIX A DATA INPUT FORMS

The following pages contain input forms which may be used to prepare data for the SOUP5V3.4 version of the R2BCSAT-83 data base. The contents of the fields on these forms were discussed in detail in Chapter 3 of this manual.

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APPENDIX B INSTALLATION AND CHECKOUT PROCEDURES FOR THE SOUP5 SYSTEM

This appendix describes the IBM job control language which can be used to run the SOUP5 system from a magnetic tape / Of course, many possible runtime sequences are possible.

The SOUP5 System is delivered in the form of a magnetic tape containing source code and data files and a card deck to run the system from the tape. The card deck is written in IBM 360/370~0S/MVS job control language (JCL) and must be rewritten in the language of the operating system of the computer on which it is to be installed. A listing of the card deck is attached as Table B-1. It performs the following steps:

- 1. Reads and copies the program source data card-image data files from tape to temporary disk files:
 - a. Pl d. DATA.Pl
 - b. P2e. DATA.SCENARIO
 - c. P3 f. DATA.PARAMS
- Compiles and loads each of the three programs, generating temporary load modules for each program, as well as compiler source listings and maps and a loader cross-reference map.

3. Runs in sequence P1, P2, and P3, using the three temporary data files generated in step 1 and the DATA.CONTROL provided on cards in the JCL decks, for the TESTOOO8 scenario in DATA.SCENARIO.

The printed outputs this run are sent directly to the system printer, using 133 characters per line output with column 1 of each line controlling printer output spacing and page breaks, in accordance with the standard FORTRAN conventions.

Appendix C contains a copy of the output as run on an IBM-370 system, using the same tape as delivered.

The results of a run on any computer system should be almost identical to those in Appendix C. The possible exceptions are listed below:

- The format and contents of the programs' compiler/loader source listings, maps, and cross references. No warning or fatal errors may occur.
- 2. The least significant digits in the outputs of P2 and P3 may vary due to machine precision differences. These must be resolved through numerical analysis.

The user may change input/output unit numbers (from the ones documented in Figure 1) by changing the first card of DATA.P1, DATA.P2, DATA.P3 for Program 1, 2 and 3 respectively. These files are documented in Chapter 3.

APPENDIX C RESULTS OF JOB USING EXAMPLE JCL

The-following-pages-contain copies of a run using the delivered tape and IBM OS/MVS Job Control Language card deck. Alt \triangle C(USN)

Source program listings and load maps are not included in the User's Manual. They may be found in the Programmer's Manual.

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*****	TOTAL	ፍ	ZERO	28.0 28.0 28.0
-CHANNE	FLT	PR	ZERO	28.0
))****	NMOO	PR	ZERO	28.0
DATA**	TOTAL	RATIO	ΚEΥ	T4DW T4DW T4DW
ECTION	FLT	RATIO	ΚEΥ	T4DW
**PROT	N300	RATIO	KEY	T4DW
ATTENUATION	PERCENT	MORST	MONTH	0.1000
RAIN	MAX	RAIN	MRGN	4.0
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	** NO. PNT. GVER 0		**************************************
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	**************************************		**************************************
	***** POL FLAG		***** Pol FLAG
	* * * * * * * * * * * * * * * * * * *		ES ** SAT ANT KEY
***** POLAR ANGLE 90.0	***SCENARIO DOWNPATH OVERRIDES *** SAT CHNL ROMTS PTSEL BMLNG BFSEL ANT KEY OPTION OPTION KEY 0 00	**************************************	****** SCENARIO FEEDERLINK OVERRIDS FLT CHNL RGMTS PTSEL BMLNG BFSEL ANT KEY OPTION OPTION OPTION KEY
* * CHN * * 01	TH OVER BMLNG B TION OP 0.00	CHN *	ERLIN NG B ON OP OO
**** SAT LAT 0.00	PATH BML OPTI 0.	**** SAT LAT 0.00	PEED BML OPTI
1A ** TA *** RGT ERR 1.00	DOWN PTSEL OPTION	ATA *** TA *** ROT ERR 1.00	ENARIO PTSEL OPTION
****************** DOWNPATH DATA **********************************	SCENARID ROMTS OPTION	**************** FEEDERLINK DATA ***** *BEAM-PTSET KEY* ****** BEAM DATA ****** OVERRIDE SAT PTNG ROT SAT U/D SERVICE AREA LONG ERR LAT D -100.00 0.10 1.00 0.00	**** SCI RGMTS OPTION
* DOWNP/ ****** SAT LONG -100.00	***** CHNL KEY	** FEEDE ***** SAT LONG -100.00	****** CHNL KEY
** ** ** ** EA -10	***** DELTA G DB O.00	* * * * * * * * * * * * * * * * * * *	***** DELTA G DB O OO
**************************************	******* S-ANT PTTOL 0.00	**************************************	******* S-ANT PTTOL 0.00
******* *BEAM-PTS OVERR U/D SERVI	# * * * * * * * * * * * * * * * * * * *	****** *BEAM-PTS OVERR U/D SERVI	***** E-ANT PTTDL
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S AHU-RZ-TST	TESTOGOB 5 AHU-RZ-TST	5 AHO-RZ-TST); AH()RZ-TST
TESTOOOB	TEST0008	TESTCOOB	TESTCOOR

BLOCK CODE

SCENARIO CD SERVICE SB KEY TP AREA KEY CD

SCENARIO SPRVICE AREA NO.

CANIN

TEST0000 5 AH0-RZ-TST 1

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			* NO. PNG. CVER.
		•	ER** AADU O. O
			CHN POLAR FM ANGLE 01 90.0 CVERIDES ************************************
			* ESA * FN X
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			SAT CATH
			DATA *** DATA *** ROT ERR 1.00 1.00 II DOWN OPTION
			H DA BEAM DA PTNG ERR O. 10 ENARIO ROMTS

			*** DOWN(* ****** SAT CA LONG -144.50 -144.50 DELTA G CHN OO.00
			****** KEY* AREA ***** *****
		•	********** OVERRIDE SERVICE AF ************************************
CI	BLOCK	CANIM	**************************************
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SCENARIO SERVICE AREA NO.	SCENARIO CD SERVICE KEY TY AREA KEY	TESTGOOR 5 CAN-PA-STD 1	TEST0008 5 CAN-PA-STD 2
8 DI 8	R 10 C	900	800 800
SCENA	SCENA	TESTO	TESTO TESTO
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*****			ANGLE	90.0	
****		S.E.	E	01	
****	****	SAT	LAT	0.00	
DATA	ATA #	ROT	ERR	1.00	
ERLINK I	BEAM DA	PTNG	ERR	-144.50 0.10 1.00 0.00	
• FEEDE	****	SAT	LONG	144.50	
************** FEEDERLINK DATA ************	*BEAM-PISET KEY*	OVERR I DE	U/D SERVICE AREA LONG ERR EAR LAT	Ĩ	
				5 CAN-PA-STD 4	

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****************** SCENARIO FEEDERLINK OVERRIDES ***************	**TRANGMITTER**	POL EIRP/POWER	FLAG FLAG VALUE	0.00 TSUT C 14.00 0.0
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RIDEE	 ب	NT	E E	5
INK OVER	u.	BFSEL A	DPTION K	18
FEEDERL		BMLNG	OPTION	0.00
CENARIO		PTSEL	OPTION	
)S ****		ROMTS	OPTION	
****		CHN	KEY	
*****	DELTA	O	DB	0.00
*****		S-ANT G	PTTOL	
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				S CAN-PA-STD
				TESTOOOB

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SCENARIO SURVICE AREA NO.	C)
SCENARID CD SERVICE SB KEY TP AREA KEY CD	BLOCK
TESTGOOS S CAN-PE-STD 1	CANC
TESTCOOB 5 CAM-PE-STD 2	************ DOWNPATH DATA *********** *BEAM-PISET KEY* ****** BEAM DATA ******* OVERRIDE SAT PING ROT SAT CHN POLAR U/D SERVICE AREA LONG ERR LAT FM ANGLE -125.00 0.10 1.00 0.00 0.0
TESTGGGB 5 CAN-PE-STD 3	**************************************
C-10 TEST000B 5 CAN-PE-STD 4	*********** FEEDERLINK DATA ********************** *BEAM-PTSET KEY* ****** BEAM DATA ******* COVERTIDE SAT PTNG ROT SAT CHN POLAR U/D SERVICE AREA LONG ERR LAT FM ANGLE U/D SERVICE AREA LONG O 10 1 00 0 00 01 0
TEST0008 3 CAN-PE-STD 5	**************************************

BLOCK CODE CANC	************ DGWNPATH DATA **********************************	**************************************	************ FEEDERLINK DATA **********************************	**************************************
SB ICO	ď	* 6	4	'n
SERVICE AREA KEY CAN-(IN-STD	TEST0008 5 CAN-UN-STD	S CAN-CIN-STD	3 CAN-DN-STD	TESTUDOB 5 CAN-UN-STD
SCENARIO CO REY TP TESTGOOB S	TESTOOOB	TESTOOOB	C-11 TEST0008	TESTUGOB

SCENARIO SERVICE AREA NO.

BLDCK CORE	************ DOWNPATH DATA ********** *BEAM-PTSET KEY* ****** BEAM DATA ******* *BEAM-PTSET KEY* ****** BEAM DATA ****** OVERRIDE SAT PTNG ROT SAT CHN POLAR OVERRIDE SAT PTNG ROT SAT CHN POLAR OVD SERVICE AREA LONG ERR ERR LAT FM ANGLE -135.00 0.10 1.00 0.00 03	**************************************	************* FEEDERLINK DATA *************** *BEAM—PTSET KEY* ***** BEAM DATA ****** GVERRIDE SAT PTNG ROT SAT CHN POLAR U/D SERVICE AREA LONG ERR LAT FM ANGLE -135.00 0.10 1.00 0.00 01	**************************************
CE SB KEY CD -STC 1	-src 2	-STC 3	-STC 4	
SCENASIO CO SERVICE REY TE AREA KEY TESTOGOS O USA-CI-SIC	8 USA-CT-STC	s USA-CT-STC	5 USA-CT-STC	TESTGOOR S USA-CT-STC
SCEMAS 10 CO REY TO TESTOGOS 3 (TESTOOOB	TEST-0008	C-15	TESTGOOR

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AREA
SERVICE
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*** POLAR ANGLE 0.0	ES ************************************	**** POLAR ANGLE 0.0	VERRIDES ************************************
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		810008	TESTÓGOB S ATN-TS-PNT
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NO. OF CHML FAMS	yd			NO. OF CHML FAMS	4		
OFFL FLAG	z			OFFL FLAG	z		
P-P DEV (MHZ)	8.00			P-P DEV (MHZ)	12.00		
TOP B-B FRG (MHZ)	2.00			TOP B-B FRG (MHZ)	5.00		
CH. NOISE BNDW (MHZ)	22. 00		8 12 16 24 28 32 36	CH. NOISE BNDW (MHZ)	22.00		IF O
CHNL SEP. (MHZ)	10.00	-	2 16 2	CHNL SEP. (MHZ)	1470		5 7 9 6 8 10
CHNL BNDWTH (MHZ)	10.00	CHANNELS	4 8 1	CHNL BNDWTH (MHZ)	10.00	CHANNELS	15 5 5 1 6 4
ND. OF CHNLS	40	NO.OF CHNLS IN FAM	œ	NO. OF CHNLS	36	NO.OF CHNLS IN FAM	n n
LOWEST FREG (GHZ)	17. 400	CARD C	#	LOWEST FREG (GHZ)	12. 400	CARD CI	#### ################################
UP / DOWN	5	OHNI MAM MU	01	/ du NW00	a	CHNL FAM NUM	000 000 4
CARD	-		C	CARD	1		ഗസസസ
CH2 KEY	CTS1 .		CTS1	CHZ	CTS4	C-14	CTS4 CTS4 CTS4 CTS4

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		0.000
PARAMETERS	UPPER	-0.274 0.920
SEGMENT	OFFSET	-0. 920 0. 000 0. 920
S *****	SLOPE (DB)	71. 000 0. 000 -71. 000
*************	END VALUE (DB)	-23.000 0.000 -23.000
*******	UPPER LIMIT	-0.920 0.274 0.000
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	CRD KEY NUM	140W 1 140W 2 140W 3

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	IER				ELEV. METERS	Ö		ADIAN TI			CANADIAN TEST DATA	ELEV. METERS	ó		CANADIAN TEST DATA	ELEV. METERS	2089. Q.
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RN NO. OF ZN PNTS	В		RN NO. OF ZN PNTS	N	ELEV. METERS	Ö	RN NO.OF ZN PNTS	en en	RN NO. OF		ო	ELEV. METERS	ó	RN NO. OF ZN PNTS	8	ELEV. METERS	000
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REA	ST		REA	ST	LOC LAT.	40.00	REA	4D		REA	6	LOC LAT.	70. 00	REA	at a	LUC	70, 00 49, 00 81, 00
SERVICE AREA	AHÜ-RZ-TST		SERVICE AREA	AHO-RZ-TST	PNT PNT	о. -	SERVICE AREA	CAN-ON-STD		SERVICE AREA	CAN-UN-STD	PNT PNT NUM TYP	1. G	SERVICE AREA	CAN-PA-STD	PNT PNT NOM TYP	₩ 4 % σ σ π,
CRD TVP	-		CRD	-		C)	CRD TYP		CRD	7 × P	7		ભ	CRD TVP	. →		n (d til
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POINT SET AND POINT INPUT DATA

TION ELEV. RN LONG. METERS ZN	-95.20 0.8 -100.01 10.8			LOCATION ELEV. RN LAT. LONG. METERS ZN		÷				TION ELEV. RN LONG. METERS ZN				TION ELEV. RN LONG. METERS ZN	-120.00 0. C			TIUM ELEV. RN LONG. METERS ZN	
PNT LOCATION TYP LAT. LON	P 49.80 I 52.00 -			PNT LOCAT						PNT LOCATION TYP LAT. LOI			АТА	PNT LOCATION TVP LAT. LON	Р 49.00 –			FNT LOCATION TYP LAT. LOS	
NCM TYP	6.9			T NON						PNT			CANADIAN TEST DATA	PNT	ო		TEST DATA	FNT	
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LUCALIUN LAT. LOHO.	52.80 -95.20 49.80 -95.20		,	LOCATION LAT. LONG.	48.00 -89.50	-	O LONG TEST POINT	-	G TEST POINT	LOCATION LAT. LONG.			CANADIAN PACIFIC FEEDERLINK	LOCATION LAT. LONG.	51.00 -126.00		CANADIAN PRÁIRIE EAST FEEDERLINK	LOCATION LAT. LONG.	99 80 - 98 99
NUM TYP	ហ ភ ច	COMMENT		PNT PNT NUM TYP	C)	COMMENT	0 LAT 0 LD	COMMENT	O LAT O LONG	PNT PNT NUM TYP	-	COMMENT	CANADIAN PAC	PNT PNT NUM TYP	Σ. Cl	COMMENT	CANADIAN PRA	THE PHT	G.
JG. METERS IN	00 00 B 00 D	RN NO. OF 2N PNTS	હ	ELEV. RN	70 0. A	. RN NO. OF ZN PNTS	n 1	RN NO. OF ZN PNTS	, d	ELEV. RN 40. METERS ZN	0.00	. RN NO. OF ZN PNTS	e 8	ION ELEV. RN LONG. METERS ZN	00 °C	RN NO. OF ZN PNTS	ດ	ELEV - RN	0 0
LAT. LONG.	56. 90 -89. 00 70. 00 -106. 00	UP/ OFFL A DN SET	2	LOCATION LAT. LONG.	41.80 -87.70	UP/ OFFL A DN SET	z	UP/ OFFL A DN SET	2	LOCATION LAT. LONG.	0.00	UP/OFFL A DN SET	z >	LOCATION LAT. LON	50, 00 -130, 00	UP/ OFFL A DN SET	2	LOCATION LAT. LONG	36, 90 ~89, 00
NUM TYP	1 P S	SERVICE AREA	USA-CT-STC	PNT PNT	1 8 4	SERVICE AREA	ATN-TS-PNT	SERVICE AREA	ATN-TS-PNT	TNT PNT	п С	SERVICE AREA	. CAN-PA-STD	PNT PNT NUM TYP	ñ Σ	SERVICE AREA	CAM-PE-STD	PNT PNT NUM TYP	1. E.
	CA3D 2 CA3D 2	PNT CRD KEY TYP	UCPD 1		UCPD 2	PNT CRD KEY TYP	1 2151	PNT CRD KEY TYP	1512 1	C-17	1512 2	PNT CRD KEY TYP	CA1U 1		CA1U ⊇	PNY CRD KEY TYP	CAGU 1		CA3U 2

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ANG.	È	REF. LNG AXIS	0.00	0.00	0.00	0.00	-89, 00	0.00	00.0	0.0	-89.00
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ENT/RE	6	FLAG F	U	0	0	0	œ	ပ	ပ	ပ	Œ
ORI			-70.00	-88. 60	-126.32	-101. 61	-98.10	00.00	-126.00	-92.00	-98, 10
	AIMPOINT	LAT.	40.00	52.06	57, 13	56, 79	36. 40	00.0	51.00	34.00	36.40
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BEAM	*** A	AREA	-151	-STD	-810	~STD	-STC	-PNT	-STD	-STD	-STC
*******	BEAN XE	SERVICE	AHÜ-RZ	CAN-ON	CAN-PA	CAN-PE	USA-CT	ATN-TS	CAN-PA -STD	CAN-PE	USA-CT
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0) 00 OPLINKK TRANSMIT CRUSSPOLAR ORI

DESCRIPTION

TBL CRD PAY OPY NO. OF MEY TYP TYP FLG CARDS

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PARAM	36.30						PARAM	B. 910	
PARAM	-20.00	-10.00					PARAM	00000	-10.00
PARAM	36.00	-25.00					PARAM	0.000	-20.00
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	0.5000	45.00	HOLLEGE BETTION		CPM-82		PARAM	0.4930	-999. 0
NO. OF PARAMS	13		NO. OF		e	NO. OF	PARAMS	13	
CR.D.		Ü	باري د د	3	0	CRD	S S	-	Cs.
•			PAT 1	:	₹				
	Ü	ო	CRD	:	-			Ci	m

TBL KEY 12AA 42AA 42AA

CPM-82 UPLINK TRANSIT CO-POLARIZED

FROAL MUMBER OF ERRORS = 0

ERRORS BY ERROR LEVEL

LEVEL = 20 COUNT = 0

LEVEL = 0 COUNT = 0

LEVEL = 0 COUNT = 0

LEVEL = 0 COUNT = 0

LEVEL = 0 COUNT = 0

LEVEL = 0 COUNT = 0

LEVEL = 9 COUNT = 0

LEVEL = 9 COUNT = 0

LEVEL = 97 COUNT = 0

LEVEL = 98 COUNT = 0

LEVEL = 98 COUNT = 0

LEVEL = 98 COUNT = 0

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CONTROL DATA

SCENAR 10= (ESTODOB

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SCENARIO LOVEL DATA

MAX RAIN MARGIN UP	4.00		
HORIZON	200.00		
NO. OF SERV. AREAS	9		
ND.OF NO.OF BLOCK DESCR SERV. FLAG LINES AREAS	80		
BLOCK FLAG	0		
NDM FRG OPT	CI		
PHI ZERO DEG	0.5		
MARGIN THRESHOLDS (DB) PHI NDM AGGREGATE DETAIL ZERO FRG I DOWN UP DOWN UP DEG OPT F	100 0 100 0 260 0 260 0 2 0 2 0		
MARGIN TH AGGREGATE DOWN UP	100 0 100.0	MAXIMUM PHI/PHIO	0.00
OUTPUT UPTIONS	111100	SINGLE VICTIM CHANNEL	0
RAIN ATTEN CALC	ભ	INHIBIT SAME-SERV INTERFER	-
AIMPOINT/ SUSSAT JP DOWN	n;	•	
A1MF SOBE UP	1		

SCENARIO DESCRIPTION CARDS

** THIS SET HAS FOLLOWING CHARACTERISTICS. NO BLOCKING, RAIN ATTN.

* ALL POINTS SELECTED, 1 CHANNELIZATION, PROT RATIO

*CALCULATED, POINTING ERRORS, C/N WITH G/T AND TEMP, BEAM CALL

*BY ID . NOM FREQ=1, SOME CARRIERS OVER HORIZON

*DB, RAIN MARGIN, CANDNSTD HAS C/N WITH MANY FEEDERLINKS.

*USES FAST ROLL—OFF SATELLITE ANTENNA AND CPM FEEDERLINK ANTENNA.

* --- SAME AS TESTOOOS EXCEPT NO BLOCKING --
* --- TEST FOR OVER THE HORIZON CARRIER ----

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					FE	FEEDERL INK					ក្ត	DOWNPATH			
	PCT-WST	PCT-UST HAX RAIN		REGUEN	FREGUENCY (GHZ)		GUARDBAND (MHZ)	(MHZ)		EGUENC	FREGUENCY (GHZ)	ថ	JARDBA	(ZHM)QN	
ΚĒΥ	HINDH	MUN'TH MARGIN		LOWER	UPPER		LOWER	UPPER		LOWER	UPPER	107	VER.	LOWER UPPER	
ES4	0.1	4.0	4.0 17.300	300	17.800		10.00	10.00	12, 200	00:	12. 700	10.	10.00	10.00	
	****	**************************************	ECTION	RATIO	*****	***			FLT	OVER	FLT				
	-O2 ****	**** CO-CHANNEL ***	NNEL ***	* -	****INDICES***	****51	BNDWDTH		NOISE	A S	NIE	PROT.	PROT. RATIO KEYS	KEYS	
	5	1000	2	5		- - -					Ē	5		- 1	
	28.00	28.00	31.00		1 1 1		1.80	0	1. 800 0. 000	0.00	0.00 2.00 T4DW T4DW T4DW	T4DW	T4DW	T4DW	

SERVICE ARICA TABLE

IBLKCD

PROTECTION RATIO TEMPLATE AND ENTRY TABLES

	****	-0. 274 0. 274
	**************************************	35. 600 -35. 600
	**************************************	0.000
<u></u>	TRY TABLE: * * UPPER * LIMIT	-0. 274 0. 920
TABLE= 2	N RATIO EN DEFSET	-0. 920 0. 000 0. 920
LENGTH OF ENTRY TABLE= 21	*PROTECTIO SLOPE (DB)	71. 000 0. 000 -71. 000
LENGT	exxxxxxxx END VALUE (DB)	
ENGTH OF TEMPLATE TABLE= 1	**************************************	-0. 920 0. 274 0. 000
FIENPLAT	**************************************	מ
LENGTH OF	*TMPLT: ***** *TABLE* *TABLE* CRD NJ.OF KFY 10% PUS. SEC	14 DW 1
	х л	Mar T

NUMBER OF REAMS= 9

ORAN2	0.00	00.00	0.00	0.00	0.00	0.00	-89. 00	-89.00	00
ORANI	00%0	155.81	0.00	149, 71	0.00	147.98	26. 70	26. 70	00.0
IOARFL	0	-	0	-	0		S	S	0
AIMLN	-70.00	-126.32	-126.00	-101.61	-92.00	-88. 60	-98. 10	-98. 10	00.0
AIMLT	40.00	57. 13	51.00	56. 79	54.00	52.06	36.40	36. 40	00.0
AXSMN	0, 60	0.95	09 .0	1.08	09 .0	0.77	1. 74	1.24	09.0
AXSMJ	0.60	3.04	0. 60	2. 26	0. 60	3.88	4.08	2. 91	0, 60
KEY	TS1ZHUHEC	CAME ASTD	CAMPASTD	CAMPESTD	UCAMPESTD	CANCINSTD)USACTSTC	JUSACTSTC	A FILL SPNT
INDEX	- 1	ณ	ю -	4	9	9	7	œ	6

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MUMBER OF ANTENNAS=

ICGN		m		m	ı	n	
EAP	0.55	0.55	0.55	0.55	0.55	0.55	C
TEMGT	1200.00	0.00	0.00	1500.00	0.00	15.74	0
IFNFL	a	0	0	C	0		•
DIACV	0.75	0.00	7.00	0.00	4.00	0.00	4
IDCFL	-	0	-	0	-	0	-
KEY	77DR	7.7DT	TISUT.	77UR	CPMB	27.UC	133.1
INDEX	-	C)	m	4		•	1~

GAIN AND GAIM ENTRY TABLES

NOT= 8 LGET= 180

PARAM/ CUEFF	2. 00000	1.00000	1.00000			-1. 00000	00000	1. 0000	1.00000		1	2. 00000	1 00000		-1 00000		1 00000		-20, 0000 -25, 0000
**************************************	2 0.000000	20.0000	25.0000		ION 2	40.0000	0000	K9. 0000	25.0000			0.00000	25. 0000	000000	40, 0000		40, 0000	0.000000	38. 0000 24. 0000
ENTRY TABLE************************************	COPOLAR REGION 0.000000 12.0000	9.00000	9. 000000 B. 50000	38. 0000 38. 0000	CRIJSSPOLAR REGION	30.0000	20,0000	1. 00000	8. 50000	0.000000 38.0000		12, 0000	30,0000	0, 000000 0, 000000	FOLAR 40, 0000	1, 00000	40,0000	1 00000 0 000000	CARICED 6, 629000 +13, 6000
ENTRY TABLE*- PARAM/ NCOEFF		4	4			- 4	⊶ ₹	+ -	- 4		ပ	m	च प	ณ	ANSMIT CROSSFOLAR 40 40	-	• चं	O.	TRANSIT (O+10!ARL75) 0.005000 0.829 -20.0000 -13.8
**************************************	EARTH STATION RECEIVE 250000 1 707000	-1. 26000	-15.1400	-999, 000	EARTH STATION RECEIVE	440000	-1. 40000	-2.00000	-15.1400	-999, 000	SATELLITE TRANSMIT	-1. 58000	-3.16000 -998.000	-999, 000	SATELLITE TRANSMIT 330000	-1 67000		-996, 000	UPLINK -12 0000 43 0500
******** PARAM/ IEGTYP	77 WARC 6	ო	ო		77 WARC E	- m	~ (າ -	σ	,	ည္	OJ.	~ ⊕	4	77 WARC 9	-	- 773	च	GPM-62 0 500000 0 8000 1 5 8000
******* NFARAM/ INOSEG	ω → ω	ო	4	ເກ	۲.	- 6	с 4	ਦੇ ਪੰ	ם. ר	7	4		αп	4	ਰਜ	r.	m	ਜ	<u> </u>
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GAIN T			•		-										-				e r
**************************************	1 13				เก 4						3 12				4 55 50				дэ 1
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					0.493000	0.00000	-30, 6000	0.000000	0.00000	0.00000
					9, 91000 -10, 0000	-9/9, 600	0, 000000	d, 660000	9, 00000	-20, 0060
								n		
7 31	וני	132	၁	4	FSS CCIR	1978 PATTERN	MAIN LOBE	FSS CCIR 1978 PATTERN MAIN LOBE GAUSSIAN COPOLAR	JCAR	
				7	લ	0.354000	m	12, 6000	0,000000	2. 000000
				Λi	-	0.711000	-	20, 0000		
				ო	4	47, 9000	Ü	-32, 0000	25, 0000	
				4	ব	000 666	CI	10,0000	0.000000	
(A)		77 .	0	Ö	UPL INKK 1	UPLINKK TRANSMIT CROSSPOLAR ORI	SPOLAR ORI			
				-		-4.10000	-	25.0000		
				Ø	m	-174, 400	4	9.70000	25, 0000	1.00000
				ო	4	000 666-	CI	10.0000	0.00000	

SEGMENT LIMIT IS ABSOLUTE VALUE OF NUMBER, IF NEGATIVE THE LIMIT IS ON PHIZPHI ZERO. IF POSITIVE THE LIMIT IS ON PHI

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UP AND DOSH FABLE SIZES

PT SETS FOINTS CHEMINS CH FAMS
UF DN UP DN UP DN UP DN 4

\$ 6 18 22 1 1 1 4

CHANNLS UP DN 8 12

	* PNT RUT SANT CHZ CH	ERR ERR KEY KEY	100 1, 000 77UR CTS1	0. 100 1. 000 77UR CTS1 01	UC CTS1	UR CTS1	UR CTS1	CTS1
	******BEAIL KEY****	F T U/D SERVICE AREA	D AHU-RZ-TST	U CAN-PA-STD	U CAN-PE-STD	D CAN-ON-STD	U USA-CT-STC	U ATN-TS-PNT
	****	FTU	2 o D	0 ව	200	٥ دع	0 വ	200
存			-		-	-	-	
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存存存存存存存存存存	E A PL POLAR DELT	ANG G SA	90.0 3.78	90.0 3.78	0.0 3.78	0.0 3.78	0.0 3.78	0.0 3.78
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****	El A	PTL	000	. 000	100	000	000	000
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「JULE AUTONIO TOTO 幸福在東京東京市市市市市市市市市市市	SAT	PWR.	4-102.6	4-102.6	14.0	124.0	251.0	1.0
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CHAMBELIZATION TABLE

TBBFRG	2.00			
CHNSBW	22.00		LINE	28 32 36
CHSEP	10.00		CHANNELS (24 PER LINE)	4 8 12 16 24 28 32 36
снви	10.00			4
NCHNZ	40		IOCHN ICHNZ	89
FROL	17. 400	CHARWEL FAMILY AND CHAMMEL TABLES	11CHN 19C	
KEY	CTS1	LY AND CH	ΚΕΥ	CTS101
INDEX	-	CHARNEL FAMI	INDEX	-

C

PPDEV

B. 00

C

EPWR 14.0

IEPFL 2 2

IEANT 3 3

IRNZN

PTELE 0. 0.

PTLNG 60.00 70.00

PTLAT 40.00 40.00

INDEX 1

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IENDP=

ISERVA: 1

POTRT SET AND POINT TABLE

EPWR 14.0 14.0

IEPFL 2 2 2

IRNZN 3 3

PTELE 0. 0.

PTLNG -130.00 -126.00 -120.00

PTLAT 50.00 51.00 49.00

INDEX 3

IENDP=

ISERVA- 2

	EPWR 14.0 14.0		EPWR 14.0 14.0		EP WR 30. 0		en en en
	IEPFL 2 2		IEPFL 2 2 2 2		16991 3		## (P*)
	IEANT 5 5		1EANT 33 3		LEARY)		on William
	IRNZN 3		IRNZN 2 2 2 2		IRNZU		ERIC 193
	PTELE 0. 0.		PTELE 0. 0.		e TELE े		6.6 E. 6.6 G.
	PTLNG -89.00 -95.20		PTLNG -95, 00 -90, 00 90, 00		PTLNG 87 70		
ENDP= 7	PTLAT 56. 90 52. 80	ENDP= 10	PTLAT 70, 00 70, 00 60, 00	ENDP= 11	PTLAT 41,80	हा ।	To the state of th
1	INDEX 6 7	IEN	INDEX 8 9 10	H	140EX 11	~	
ISERVA# 3		[SERVAR 4		TATROLA S		\$ - 80BEC	

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	CHZ	حر لنا ک	CTS4	CTS4	CTS4	CTS4	CTS4	COLO
	FN40	Y K:	77DT	77DT	77DT	77DT	77DT	777T
	RUT	ERR	1.000	1.000	1.000	1.000	1.000	000
	PNT	ERR	2. 100	001.0	001.0	001.0	001.0	
	MAIN KEY****	SERVICE AREA	AHU-RZ-TST (CAN-PA-STD (CAN-PE-STD (CAN-ON-STD (1 2 0 D USA-CT-STC 0.100 1.000 77DT CTS4 03	ATM-TG-DNIT
	日本本本日	0/0	۵	Ω	Ω	۵	Ω	=
	本のか	F	O	0	20	U O	<u>0</u>	0
÷ 7.			-	-			7	-
タスタの名かなかのかのなかのできますのです。 おうていてい アファファン スレーサ	SAT	SATLONG LAT	-100.00 0.00	-144, 50 0, 00	-125.00 0.00	-125, 00 0, 00	0 0.00 .000 2 0.0 3.78 -135.00 0.00	-70 00 0 00
	DELT	o,	3.78 -	3.78 -	3.78 -	3.78 -	3.78	27
	PULAR	ANG	90.0	90.0	0.0	0	0.0	c
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	EA	PTL	000	. 000	100	000	000	
יי דריי	ß A	PTL	0.00	0.00	0.20	00.00	0.00	9
	E E	AD C	0 0	0	0	0.0	0.0	0
L INVITE IT PRESENTED TO THE	P SAT	F PUR	4-102.6	4-102. 6	2 14.0	3 124.0	3 251.0	-
	CHP.	٤	_	_	ÇŲ.	m	4	4
	10× C	ANT F	ed.	Гij	સ	ભ	(4	<u>ئ</u>
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CHARMELIZA I 10N	TABLE	
	<u> </u>	

ТВВЕЯС	5.00
CHINSBU	22.00
CHSEP	14. 70
CHBW	10.00
ZNHUN	38
FRGL	12. 400
KEY'	CTS4
THOEX	17
-	

PP0EV

12.00

CHANNEL FAMILY AND CHANNEL TABLES

CHANNELS (24 PER LINE)	
ĒR	6 0
42	V 80
· ::	n 4
ME C.	W 4
CHAN	- 21 CI
ICHNZ	ਲ ਜ ਜ ਜ
11CHN - 19CHN	01 12 11
I 1 CHN	1 2 2 1 1 1
KEY	CTS401 CTS402 CTS404 CTS403
INDEX	W 10 4

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			IEPFL 0 0		IEPFL 0 0 0	0000		IEPFL 0 0 0 0 0		1EPFL 0 0		IEPFL O		
			IEANT 1 1	•	IEANT 1	ਜ ਜ ਜ ਜ		IEANT		IEANT 1		IEANT 1		
DATA			I RNZN O O		188 N2N C1 C1 C1 C1	W 01 4 01		IRNZN CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC		18 8 8 8 8 8 8		I RNZN		
DOWNPATH DATA				PTELE 0. 0.		PTELE 0. 0. 0.	2989. 0.0. 0.0.		PTELE 0.00.00.00.00.00.00.00.00.00.00.00.00.0		PTELE 0. 0.		PTELE 0.	
			P TLNG 60.00 70.00		PTLNG -141.00 -120.00 -120.00	-130.00 -120.00 -145.00 -130.00		PTLNG -89, 00 -95, 20 -75, 20 -106, 00 -100, 01		PTLNG -95.00 -80.00 80.00		PTLNG		
	AND POINT TABLE	ਭ [–] (8)	ਭ [–] (ਰ)	c:	PTLAT 40.00 40.00	01 ≖d(PTLAT 70.00 70.00 60.00	70.00 49.00 81.00 70.00)P= 16	91LAT 52. 80 52. 80 49. 80 70. 00 49. 80 52. 00	P= 19	PTLAT 70,00 70,00 60,00	P= 21	PTLAT 41 00
		IENDP=	INDEX 1 2	I ENDP ==	INDEX 3 4 5	V 8 & O1	IENDP=	INDEX 111 112 113 114 115	I ENDP =	INDEX 17 18 18	IENDP=	INDEX 20		
·	POINT SET AND	1SERVA- 1		ISERVA= 2			ISERVA= 3		ISERVA= 4		ISERVA= 5			

3 3 3 3 3

P2 (1017-015) паквативан метанпансанананан политичен на

POOR QUALITY

D. 1470000E-01GHZ

CHINL SEPAR.

NO. OF CHNLS=36

HE 2TH TEST POINT, WHICH BELONGS TO SERVICE AREA AHO-RZ-TST, IS SOVER THE HORIZON OF ITS SATELLITE. 15 OVER THE HORIZON OF ITS SATELLITE. BEL -DNIEDSNE**

1TH TEST POINT, WHICH BELONGS TO SERVICE AREA AHO-RZ-TST,

BEL - DESERVENCE

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O IMATRX=

14001 =

HE 10TH TEST FOINT, WHICH BELONGS TO SERVICE AREA CAN-ON-STD, IS OVER THE HORIZON OF 1TS SATELLITE.

1 FOR TUP=2 VIOLATES THE RARC PARAMETERS. 0, 999999BE-02GHZ 12, 40000 CHALLZIN SCHEME CHIC BNDMD TH= LOWEST FREG= ONLINE MERRY

THE TEST POINT, WHICH BELINGS TO SERVICE AREA AND-RI-TST. 15 JUER THE HORIZON OF 115 SATELLITE. ä.

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BLITTLE SIT OF BUILDING THE MEY OF

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| MIT -- [70 ULDES 1031P = 7 IMBINU= 8 INBIND= 9 IOUTBN= 11 [ERUTT= 12] | AGGN= 8 IAGON- 9 IMBIND= 19 IMBIND= 15 IOUTBD= 14 IDIAG= 13 IRPT= 17 IRPTS= 16 IRPTS= 12 IMATRX= 14 | LDES FER PAGE UN REPORTS = 60

SCENARIO DESCRIPTION

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MAX C/I = 260.00

DUTAIL REPORT # 1 FOR TESTOGOS UP

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J178946 #		j		} 4	;		G: 500		ANTEMA		***		, , , , , , , , , , , , , , , , , , ,	Ĉ	2 0 1
NINTERED	S TENERAND S	SAT LONG DEG-E	Ω	EARTH STA * LAT LÜMG EG-N DEG-E	08 08	PFD DB W/SQM	FOUNER POWER	####### 000	AN -ERIVA GNG-X DB	64145 847-00 08	******	CAIN DB	CAT	D.	<u>ا</u>
АНОВ 2 Г.S.)	A P. B. Z. F. S. T. A. C. B. Z. F. S. T. S	. 17777	50.0 51.0 51.0 56.9 52.8	130.0 1126.0 120.0 189.0 195.2	RECE RECE RECE -27.04 -22.11 -44.44 -48.22	IVER IVER IVER 173. -179. -151. -161.	ER HORIZE ER HORIZE ER HORIZE -214. 16 -219. 08 -195. 29 -195. 29 -196. 76	DN FRUM DN FRUM DN FRUM DN FRUM -10 00 -10.00 -6.67	115 OWN T 115 OWN T 115 OWN T 110 OWN T -10 OWN T -10 OWN T -10 OWN T -10 OWN T -10 OWN T -10 OWN T -10 OWN T -10 OWN T -10 OWN T	RANSHI RANSHI RANSHI 4. 7 4. 7 5. 4 12. 9 12. 9	TTER TTER TTER 0.00 12 0.00 18 0.00 00 0.00 1 0.00				000 000 8 x x x
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SCENARIO DESCRIPTION

THIS SET HAS FOLLOWING CHARACTERISTICS. NO BLOCKING, RAIN ATTN,
ALL POINTS SELECTED, 1 CHANNELIZATION, PROT RATIO
CALCULATED, POINTING ERRORS, C/N WITH G/T AND TEMP, BEAM CALL
BY ID, NOM FREG=1, SOME CARRIERS OVER HORIZON FEEDERLINKS.
USES FAST ROLL—OFF SATELLITE ANTENNA AND CPM FEEDERLINK ANTENNA.
-- SAME AS TESTOOOS EXCEPT NO BLOCKING -TEST FOR OVER THE HORIZON CARRIER ----

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SCENARIO DESCRIPTION

THIS SET HAS FOLLOWING CHARACTERISTICS. NO BLOCKING, RAIN ATTN,
ALL POINTS SELECTED, 1 CHANNELIZATION, PROT RATIO
CALCULATED, POINTING ERRORS, C/N WITH G/T AND TEMP, BEAM CALL
BY ID, NOM FREG=1, SOME CARRIERS OVER HORIZON
DB, RAIN MARGIN, CANDNSTD HAS C/N WITH MANY FEEDERLINKS.
USES FAST ROLL—OFF SATELLITE ANTENNA AND CPM FEEDERLINK ANTENNA.
--- SAME AS TESTOOOS EXCEPT NO BLOCKING.---- TEST FOR OVER THE HORIZON CARRIER.----

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MAX C/I= 260.00

DETAIL REPORT # 2. FOR TESTODOS UP

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SCENARIO DESCRIPTION

THIS SET HAS FOLLOWING CHARACTERISTICS. NO BLOCKING, RAIN ATTN,
ALL POINTS SELECTED. 1 CHANNELIZATION, PROT RATIO
CALCULATED. POINTING ERRORS, C/N WITH 0/T AND TEMP. BEAM CALL
BY ID , NOM FREQ=1, CARRIERS OVER HORIZON
DB, RAIN MARGIN, CANDNETD HAS C/N WITH MANY FEEDERLINKS.
USES FAST ROLL-OFF SATELLITE ANTENNA AND CPM FEEDERLINK ANTENNA.
-- SAME AS TESTOOOS EXCEPT NO BLOCKING -TEST FOR OVER THE HORIZON CARRIER ----

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THIS SET HAS FOLLOWING CHARACTERISTICS. NO BLOCKING, RAIN ATTN, ALL POINTS SELECTED, 1 CHANNELIZATION, PROT RATIO
CALCULATED, POINTING ERRORS, C/N WITH G/T AND TEMP, BEAM CALL BY ID, NOM FREG=1, SOME CARRIERS OVER HORIZON
DB. RAIN MARGIN, CANDNSTD HAS C/N WITH MANY FEEDERLINKS.
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LOWER ADJ C/I MARGN	ZON FROM ZON FROM	50.0 36.35.0 21.35.0 23.4 23.0 42.8 28.4 44.2 27.4 43.0 29.	45.6 31. 46.3 32. 45.6 31. 34.7 20. 45.5 31. 44.6 30.	99. 0 99. 0 99. 0 99. 0 IZON FROM	44. 9 30. 40. 7 26. 99. 0 99.
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K SERVICE AREA	AHORZIST -100.	CANPASTD	CANPESTD	CANDMSTD	USACTSTC -135.0 -135.0 ATNTSPNT -70.0

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AGGREGATE DOWNPATH SUMMARY FOR TESTOOGE

SCENARIO DESCRIPTION

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	R OVER R OVER	0.83.00 0.83.00 0.83.00 0.83.00 0.40 0.80 0.40 0.40 0.40 0.40 0.40 0	28.6 28.6 28.6 27.7	002	27. 9	0.66
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CO-CHANNEL C/I MARGN		444444444444444444444444444444444444444	32.9 33.8 30.8 30.5 35.0	0.63	33.8 21.9	91.0
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APPENDIX D

NUMERICAL LIMITS ON SCENARIO DATA REQUESTS AGE LISTED.

The SOUP5 system has some limits on the maximum number of tables which can be included in each scenario. These numbers were chosen to be large enough to accommodate almost every conceivable scenario. The limits below are incorporated in SOUP5 Version 3 Mod 8 (SOUP5V3.8). They can be changed at each installation if desired. See Appendix B of the Programmer's Manual. The current values at each installation can be found on lines 5-25 of DATA.P1.

LIMIT	VALUE
Number of Service Areas	300
Number of feederlink transmitters	2400
Number of earth station receivers	2400
Number of point overrides	500
Number of points in one point set	50
Number of scenario description lines	10
Number of channelizations for up	15
Number of channelizations for down	15
Number of channel families for up	40
Number of channel families for down	40
Number of protection ratio templates up, down, and total	3

LIMII	VALUE
Number of ellipses, up and down	360
Number of antennas up and down	160
Number of Gain tables up and down	60
Number of Gain entries up and down	1500

APPENDIX E ERROR HANDLING, ERROR MESSAGES AND EDITING PROCEDURES ARE ALCO LISTED

An important function of SOUP5 is editing the data for errors and inconsistences.

When Program 1 detects an error, it takes the following steps:

- Prints an error message describing the error in the input echo report (Unit IURPT)
- Assigns an error severity code; the codes are described below:
 - -20 Minor error, no effect
 - -21 Minor error, no probable effect
 - -22 Results may be affected but calculations can continue
 - -97 Part 1 and Part 2 may continue, but Part 3 cannot process
 - -98 Part 1 may continue, but Part 2 cannot process
 - -99 Part 1 cannot continue.
- Stores the value of the highest error code encountered.
- If the highest error code is greater than or equal to the stop code, (Columns 1-2 of 1st control record), the program stops with a stop code of 99.

- If the stop code is greater than the highest error code, processing continues whenever possible
- At the end of the input echo report (on unit IURPT), the program prints a count of the total errors, and the errors listed by error severity code level. An example of the list is reproduced below.

TOTAL NO	JMBER	OF E	RORS	=	0
ERRORS E	SY EF	ROR LI	EVEL		
LEVEL =	20	COUNT	=	0	
LEVEL =	21	COUNT	=	0	
LEVEL =	22	COUNT	=	0	
LEVEL =	0	COUNT	=	0	
LEVEL =	0	COUNT	= .	0	
LEVEL =	0	COUNT	=	0	
LEVEL =	0	COUNT	=	O .	
LEVEL =	97	COUNT	=	0	
LEVEL =	98	COUNT	=	0	
LEVEL =	99	COUNT	=	0	

 At the end of the run, the program terminates with a stop code equal to the highest error code encountered.

Program 2 handles errors in a similar fashion except that the error messages, documented in section 4.2.2 are written on unit IERUNT.

PROGRAM 1 ERROR MESSAGES

Program 1 produces a variety of error messages. Each message with its severity level is listed below, with further explanation if necessary. An error level greater than the stop code (ISTOP) in DATA.CONTROL will cause the program to stop.

ERROR NUMBER	ERROR MESSAGE	ERROR LEVEL
1	Pl control data not found	99
2	Error reading P1 control data	99
	 the record does not match the FORTRAN format 	

ERROR NUMBER	ERROR MESSAGE	ERROR LEVEL
3	Premature end of file in control data	99
4	Error reading control data for P2-P5 - one of the records does not match FORTRAN format	99
5	Requested scenario not found in scenario file - check for misspelled scenario in control file	99
6	Error reading scenario file - a record in the scenario file does not match its FORTRAN format	99
7	Scenario file is out of sort - The numbers in the card type field or subcard field are not the correct sequence.	21 :e
8	Premature end of scenario file - Check that number of service areas (cols 65-67 of Record 3 in Data.Scenario) is not greater than number of service are in scenario.	
9	Out of space in array LKEY - the array designed to hold all the unique requested keys for antennas, point sets, beams, protection ratios, service areas, channel families, and gain tables is fill	•
10	Out of space in tree arrays - the arrays designed to hold all tree data (see error 9 above) is filled	99

ERROR NUMBER	ERROR MESSAGE	ERROR LEVEL
11	Too many description lines truncating to max See Appendix D	20
12	To many service areas truncating to max. See Appendix D	98
13	Too many channelizations - number of channelizations exceeds maximu See Appendix D	99 m.
14	Channelization file is out of sort - Channelization should be sorted of 1st 4 bytes, character ascending	21
15	End of Chzth data while searching for key - a non-existent channelization was requested - possible misspelling	° 97
16	Channelization key not in Chztn data - check for misspelling (note: channelization key is character, not numeric. "01" is not the same as " 1").	97
17	Premature end of parameter file	99
18	Error reading parameter file - record does not match FORTRAN format	99
19	Too many channel families - number of requested channel families exceeds maximum. See Appendix A	99

ERROR NUMBER	ERROR MESSAGE	ERROR LEVEL
20	Channel family key not in Chztn data - check for misspelling (note: channelization key is character, not numeric. "01" is not the same as "1"	98
21	Too many channels in channel table - number of channel exceed maximum. See Appendix D	99
22	Using Down/Up Chztn for up/down paths - a channelization flagged as UP is being used for down path or vice versa	22
23	End of RARC Param data while searching for key - cannot find key, check for misspelling	97
24	Protection ratio set key not in data - cannot find key, check for misspelling	97
25	Too many protection ratio template sets - number of protection ratio templates exceeds maximum allowed. See Appendix D	99
26	End of Prot Ratio data while searching for ke - cannot find protection ratio key, check for misspelling	ey 97
27	RARC param data out of sort - See Note C	21
28	Not all beams found - A non-existent beam requested. Check for misspelling	97

ERROR NUMBER	ERROR MESSAGE	ERROR LEVEL
29	End of beam data while searching for keyA non-existent beam requested, check for misspelling	97
30	Point set file out of sort - See Point set section of 3.3.2 for sorting sequence	21 ng
31	Point set key not in point set data - check for misspelling	97
32	Too many points in point table - number of points in table exceeds maximum See Appendix D	99 n.
33	End of point set data while searching for key - cannot find requested key. Check for mis	
34		98
. 35	Too many points in a point set - number of points in set exceeds maximum. See Appendix D	99
36	Gain table file out of sort - Gain tables should be sorted on first 4 bytes, character ascending	21/99
37	Gain table key not in gain table data - request for a non-existent key check for misspellings	97
38	Illegal gain pattern type Pattern must be 1 to 15	97

ERROR NUMBER	ERROR MESSAGE ERR	ROR LEVEL
39	Too many gain tables - number of requested gain tables exceeds maximum. See Appendix D	99
40 .	End of gain table data while searching for key - request for a non-existent gain table	97
41	Too many beams - number of requested beams exceeds maximum. See Appendix D	99
42	End of antenna data while searching for key - request for a non-existent antenna, check misspellings	97
43	Too many antennas - number of requested antennas exceeds maximum See Appendix D	, 99 n
44	Not all antennas found - request for a non-existent antenna, check for misspellings	98
45	Too many gain table entries - gain table entry table exceeds maximum size. See Appendix D	99
46	Not all gain tables found - request for a non-existent gain table	22
47	Not all channel families found - request for a non-existent channel family (see error 20)	98

ERROR NUMBER	ERROR MESSAGE	ERROR LEVEL
48	Not all protection ratios found - request for a non-existent protection ratiset. Check for misspellings	21 io
49 .	Too many point overrides - number of point overrides exceeds maximum. See Appendix D	99
50	No diameter or cov ang specified for E-ant. Earth antenna has a diameter/ coverage angle ≤ 0 .	97
51	Diameter or Cov. Ang specified for S-ant - satellite antenna coverage angle is set by beam data, not antenna data. Number or antenna record will be ignored	22
52	Channels are out of order - channels must be listed in ascending order	22
53	Protection ratio data out of sort	21
54	Too many protection ratio sets - number of requested protection ratio sets exceeds maximum	99
55	Circular antenna has unequal axes	22
56	<pre>LAT. of PNT. > 70 Deg. rain attenu = 0 dB - the rain attenuation model is not valid within 20 degrees of pole. Rain attenuat for this point will be set at 0 dB</pre>	20 ion

ERROR NUMBER	ERROR MESSAGE	ERROR LEVEL
57		97
58	Up/down data not present for requested calcs. A up or down calculation was requested and the up or down scenario cards are not prese	
59	Delta-G zero or megative	98
60	No satellite power type flag. - The satellite power flag was not set either as a default or in the service area	98 her
61	Satellite power set to zero - Satellite transmitter power is specified as 0 Watts	98
62	No FLT power flag - The FLT power flag was not set either as a default, or in the service area	98
63	FLT power set to zero - FLT transmitter power is set to 0 Watts	98
64		
65	No Earth Antenna specified - The Earth antenna key fields, both in the Scenario header and service area cards as	
66	No satellite antenna specified - Similar to Note 65 above	98

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FRROR NUMBER	ERROR MESSAGE	ERROR LEVEL
68	 dB value to large (small), possible problem A dB value has a absolute value so large that an underflow or overflow problem may exist. 	97
69	No rain zone specified - The rain zone fields in both the point se header and the point itself are both blan	
70	No protection ratio specified - A needed protection ratio key field has been left blank	98
71	Transmit antenna used as a receiver	98
72	Receive antenna used as a transmitter	21
73	Receive antenna has no noise temperature specified	97
74	Receive antenna has no noise/figmerit flag	97
75	Min. FLT antenna diameter must be > 0 This field (cols 16-19 of RARC record 1 in Data.Parameters) must be > 0, even if antenna gain type 4 is not used.	
76	P2 Graphs phi-zero must be > 0	98
77	Channel Bandwidth must be > 0	22
78	Channel separation should be > 0	22
79	Channel noise bandwidth should be > 0	98

ERROR NUMB	BER ERROR MESSAGE	ERROR LEVEL
80	Channel separation should be > 0	98
81	Peak-to-peak deviation should be > 0	98
82	Channel number exceeds no. of channels	20
83	Percent-worst-month must be non-negative	98
84	Read error in Requirement file	99
85	Read error in Ellipse file	99
86	Read error on reading a point override card.	99
87	Single Vtm chnl incompatible with group flag - either turn group flag (col 75 scenario Record 3) to "N" or single victim channel (col 62-63 of same record) to zero	22
88	No points selected from set. - No points of the point types requested in the point selection code exist in the point set	98
89	Report option unspecified, set to "NO"	20
90	Scenario field protected - cannot override - The installation has designated a scenario field (marked by astericks in the control override output reports) as protected from overrides.	22

ERROR NUMBER	ERROR MESSAGE	ERROR LEVEL
91	All interference calculations inhibited - The existence of optional Control Records 9, 10 or 11 indicate that the user wants t calculate interference only into selected service areas, but none of the requested a names match service areas in scenario	
92	Max Phi/PhiO cannot be negative	98
	- Put O or positive number in col. 59-61 of	

Scenario Record 3

APPENDIX F

HOW TO ENTER A PROTECTION RATIO TEMPLATE HAVE GIVEN.

The template in Figure 2 has five segments, as noted in the caption. Now we shall find the necessary parameters for the segments.

- Segment 1
 - Upper limit
 The upper normalized frequency of this segment is -.982
 - Offset The offset is the normalized frequency coordinate of some point on the segment whose value we know. The labeled end point is the obvious choice, -.982
 - Slope 86 from the figure
 - Segment value at offset
 We have chosen the end point as the offset point. At this point the value is -22 dB.
- Segment 2
 - Upper limit
 - -.248

- Offset
 We can choose either end point for the offset. Arbitrarily
 we choose the upper end point, -.248
- Slope Slope is equal to $(\Delta PR/\Delta \text{ frequency})$ where Δ means difference ((22) - 0)/((-.982) - (-.248)) = 29.97
- Segment Value at Offset
 The value at the upper end point, chosen as offset, = 0.
- Segment 3
 - Upper limit.248
 - Offset
 We choose .248 (because the slope is zero, we could use any number as an offset the segment-value at-offset will always be zero)
 - Slope.
 - Segment-value-at-offset0
- Segment 4
 - Upper limit.82
 - Offset We choose .82
 - SlopeAs in Segment 2, we calculate 29.97F-2

Segment-value-at-offset-22

Segment 5

- Upper limit
 As this last segment extends indefinitely the upper limit
 has no meaning, we leave it blank
- Offset
 We know the value at only one point, .92, so we choose it as an offset
- Slope-86
- Segment value at offset-22.0

FIGURE 2 SAMPLE PROTECTION RATIO TEMPLATE

The following template is composed of 5 segments (each segment is labeled with a circled number). The two end segments 1 and 5, extend indefinitely. The segments are also designated.

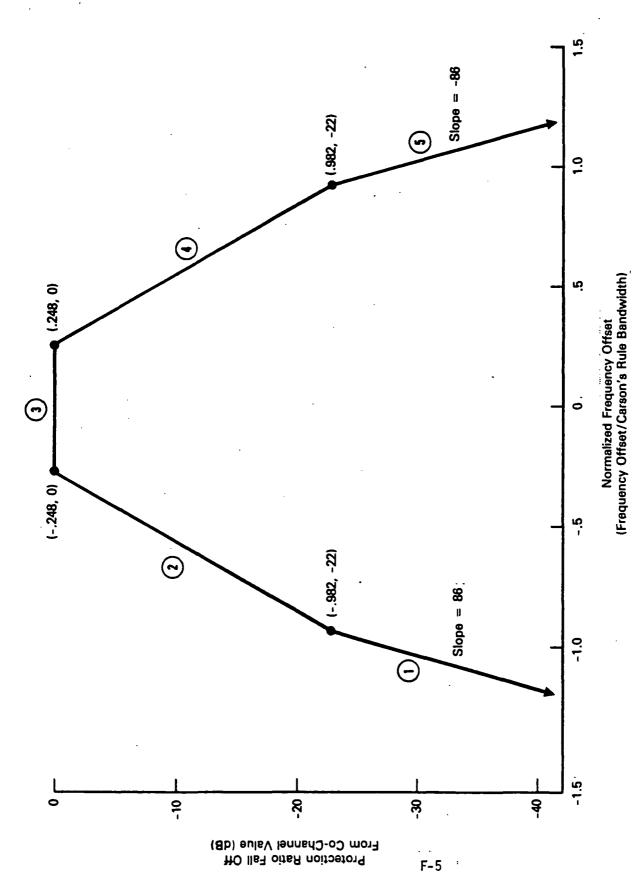


FIGURE '2

APPENDIX G

RELATION BETWEEN RARC PARAMETER, CHANNELIZATION, CHANNEL

FAMILIES, AND INTERFERENCE CATEGORIES

Meg Li's 15/19

The channelization data contains the following information:

- Lowest Center Frequency. The center frequency of channel 1
- Number of channels. Used only to determine whether the RARC parameters are violated
- Channel Bandwidth. Also used only to determine the whether the RARC parameters are violated
- Channel Separation. Used to determine the center frequency of all channels except channel 1
- Channel Noise Bandwidth. Used only to determine carrier to noise ratio
- Top Baseband Frequency and Peak-to-Peak Deviation. Used to determine Carson's Rule Bandwidth for protection ratio calculations.

Figure 3 gives a sample of a set of RARC parameters, channelization and a set of channel families.

A violation of the RARC parameters would occur only if a channel in the family overlaps one of the two guard bands. Channel one does not overlap the guard band, but if the number of channels in the channelization is greater than 36, the upper channels will overlap the upper guard band and the user will be warned. The L, M, and H on each channel family illustrate the nominal frequency the user will get for each channel family by specifying the low, median, or high nominal frequency option. As mentioned above, this frequency is used for all gain and attenuation calculations.

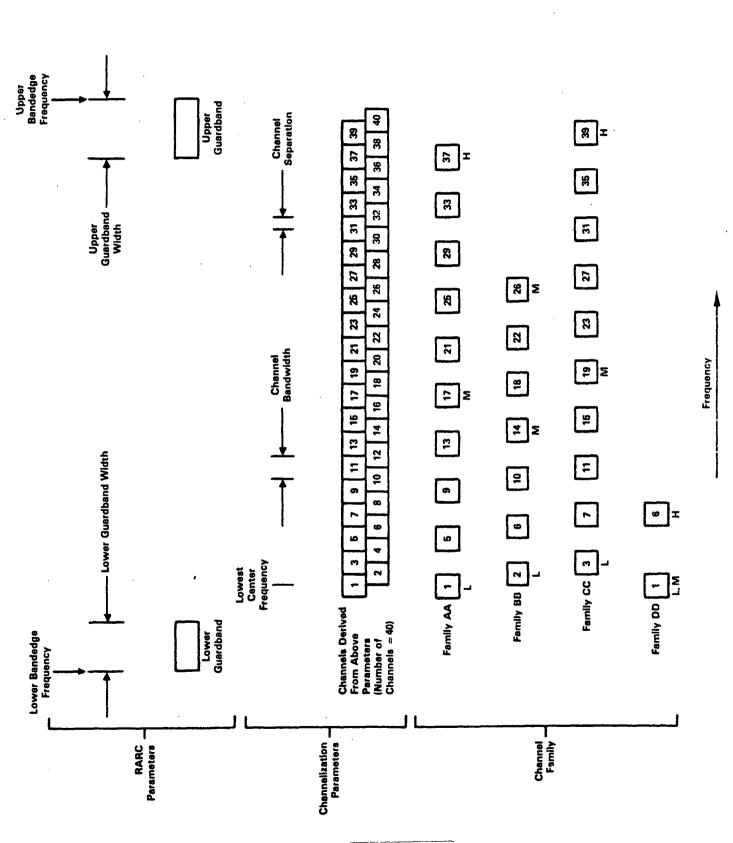
The interference categories between the four families are calculated using the channel numbers only (the effect of the bandwidth is taken into account during the calculation of protection ratio from the template (Section VIII.D above).

We discuss some of the interference categories between the four families below, using the notation $X \Rightarrow Y$ to designate channel family X interfering into channel family Y.

- AA > AA, BB > BB, CC > CC, and DD > DD all co-channel (obviously!)
- AA → BB
 All channels receive lower adjacent interference
- AA > CC Most channels in CC receive both next-upper-adjacent and next-lower-adjacent interference simultaneously.
- AA → DD
 Here we have both co-channel, next-upper-adjacent and next-lower-adjacent interference categories simultaneously.

- BB → AA
 All channels are upper adjacent
- BB → CCLower adjacent

Other family pairs are done in an analogous fashion.



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